

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS
Example: AUTOMATED MANUFACTURING PLANT

Disclosure for Claims 1, 3-6 and 8-13

The invention relates to a data compression and encryption system for monitoring and controlling an automated manufacturing process. The system translates the outputs of various sensors from an automated plant's manufacturing process into digital data signals. The system then processes the digital data signals into a compressed signal of various length codewords, encrypts the compressed signal, and transmits the compressed and encrypted signal to a remote supervisory location. At the remote supervisory location, the signal is decrypted and decompressed. The remote supervisory location then compares the decrypted and decompressed digital data signals to the preset ranges for the respective operating parameters of the automated plant's manufacturing process, generates a digital correction signal on the basis of the comparison, compresses and encrypts the correction signal, transmits the correction signal back to the plant location, and applies the correction signal to the disclosed process controllers, such as valves and motors, to maintain the automated plant's operation within its design parameters.

The automated plant's manufacturing process is controlled with a general purpose computer system. In the plant's general purpose computer system, various memory sections are included to store the plant's operating parameters and the sensor's outputs. The plant's various sensors and sensing systems are disclosed.

The remote supervisory location's process is implemented on a general purpose computer system. The remote supervisory location's general purpose computer system must have the identical compression and encryption capabilities of the automated plant's general purpose computer system.

The general purpose computer systems of the automated manufacturing plant and the remote supervisory location are programmed by a data signal transmitted from a remote main office location. The data signal includes a carrier wave and the source code segments for both the compression and encryption computer programs.

In the preferred embodiment for data compression, the general purpose computer system at each site is programmed with a computer program to compress/decompress a digital signal into variable length codewords in accordance with the Huffman code algorithm. The general purpose computer system has both an encoder and a decoder on which are stored identical Huffman code books. The use of compressed signals allows for reduced transmission time between the sites.

In the preferred embodiment for data encryption, the general purpose computer system at each site is programmed with a separate computer program to encrypt/decrypt a digital signal in accordance with the Data Encryption Standard (DES) algorithm. The DES algorithm uses an encryption key stored in a read-only memory to produce a digital signal whose content is protected and secured for transmission. In another embodiment for data encryption, the general purpose computer system has an application specific integrated circuit (ASIC). The various components of the ASIC are incorporated by reference from U.S. Patent No. *,***,***.

The disclosure contains both self-documenting source code for the preferred embodiments of the computer programs and high-level written descriptions of the computer programs with flow charts. There is correspondence between the written descriptions, the flow charts, and the specific software. The disclosure states that alternate computer programs based on the high-level written descriptions and flow charts are within the skill of a routine in the art.

March 28,1996
Disclosure (Claims 1, 3-6 and 8-13) - Page 1

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS
Example: AUTOMATED MANUFACTURING PLANT

Claim 13

A computer data signal embodied in a carrier wave comprising:

- a. a compression source code segment comprising . . . [recites self-documenting source code]; and
- b. an encryption source code segment comprising . . . [recites self-documenting source code].

March 28, 1996
Claims - Page 37

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS
Example: AUTOMATED MANUFACTURING PLANT

Table for Claim 13

BOX 2	Q.2a. Does disclosed invention have practical application?	YES	GoTo: Q.2b	Note 1
	Q.2b. Is disclosed invention in technological arts?	YES	GoTo: Q.6a	Note 2
BOX 6	Q.6a. Is claimed invention a computer program <i>per se</i> ?	NO	GoTo: Q.6b	Note 3
	Q.6b. Is claimed invention a data structure <i>per se</i> ?	NO	GoTo: Q.6c	
	Q.6c. Is claimed invention non-functional descriptive material?	NO	GoTo: Q.6d	
	Q.6d. Is claimed invention a natural phenomenon?	NO	GoTo: Q.8	Note 4
BOX 8	Q.8. Is claimed invention a series of steps to be performed on a computer?	NO	GoTo: Q.9	
BOX 9	Q.9. Is claimed invention a product for performing a process?	YES	GoTo: Q.10	
BOX 10	Q.10. Is claimed invention a specific machine or manufacture?	YES	GoTo: END	Note 5
BOX 12	Q.12a. Does process have post-computer process activity?		GoTo:	
	Q.12b. Does process have pre-computer process activity?		GoTo:	
BOX 13	Q.13a. Does process manipulate abstract idea w/o limitation to a practical application?		GoTo:	
	Q.13b. Does process solve math problem w/o limitation to a practical application?		GoTo:	

March 28,1996
 Claims - Page 38

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS
Example: AUTOMATED MANUFACTURING PLANT

Table Notes for Claim 13

- Note 1: Disclosed invention monitors and controls an automated plant's manufacturing process.
- Note 2: Disclosed invention uses a general purpose computer system.
- Note 3: Claimed invention recites specific software embodied on a computer-readable medium, i.e., specific software embodied in a carrier wave.
- Note 4: Most likely, the "data signal" does not occur as a natural phenomenon. The Examiner bears the burden of establishing that a claimed invention is a natural phenomenon. Therefore, absent object evidence to support the position that the "data signal" is a natural phenomenon, such a position would be untenable.
- Note 5: Claimed invention recites specific software. *See Guidelines, Section IV.B.2(a)(ii).*
THE REMAINDER OF THE EXAMINATION MUST BE COMPLETED.
- For a more detailed analysis of the claim, see Examination Guidelines for Computer Related Inventions. Example: Automated Manufacturing Plant Claim Analysis appended to these examples.

March 28, 1996
Claims - Page 39

EXAMINATION GUIDELINES FOR COMPUTER-RELATED INVENTIONS
Example: AUTOMATED MANUFACTURING PLANT

Claim Analysis

Claims 1-13 are pending in the application. Claims 1-13 recite computer-related invention

CLAIM 1:

Claim 1 is a machine claim. It recites three claim limitations in means plus function language:

- a. Means a. recites means for receiving. The specification discloses use of a general purpose computer system. It does not disclose specific hardware, specific software, or a combination thereof for this function;
- b. Means b. recites means for processing. Processing is defined as compressing the digital data signal into variable length codewords. The specification discloses specific software in a preferred embodiment. It also discloses use of a general purpose computer system with encoders and decoders, and the creation of alternate computer programs based on the disclosed high-level written descriptions and disclosed flow charts; and
- c. Means c. recites means for outputting. The specification discloses use of a general purpose computer system. It does not disclose specific hardware, specific software, or a combination thereof for this function.

Reviewed as a whole, and given its broadest reasonable interpretation, the claim is not limited to a specific machine. Thus, the claim is presumed to encompass any and every machine embodiment of the underlying process. Accordingly, the claim has been analyzed on the basis of the underlying process. If applicant believes the claim is limited to a specific machine, please provide specific information on how the claim is so limited, including references to the specification in support of the limitation[s].

The underlying process does not require any pre-computer process activity. Means a. merely provides the data signal for use in the mathematical operation of means b. It does not measure physical objects or activities. The underlying process also does not require any post-computer process activity. Means c. merely conveys the direct result of means a. and b. Thus, as a computer-related invention, the claim must be limited to a practical application.

Means b. recites means for processing. Means b. corresponds to the compression of a digital data signal into variable length codewords. A compressed data signal requires less memory or takes less time to transmit. Thus, the claimed invention is limited to a practical application. Claim 1 is a statutory machine claim.

CLAIM 2:

Claim 2 is a machine claim. It recites three claim limitations in means plus function language:

- a. Means a. recites means for receiving. The specification discloses use of a general purpose computer system. It does not disclose specific hardware, specific software, or a combination thereof for this function;
- b. Means b. recites means for processing. Processing is defined as the calculation of codewords from a series of equations. The specification discloses use of a general purpose computer system. It does not disclose specific hardware, specific software, or a combination thereof for this function; and
- c. Means c. recites means for outputting. The specification discloses use of a general purpose computer system. It does not disclose specific hardware, specific software, or a combination thereof for this function.

Reviewed as a whole, and given its broadest reasonable interpretation, the claim is not limited to a specific machine. Thus, the claim is presumed to encompass any and every machine embodiment of the underlying process. Accordingly, the claim has been analyzed on the basis of the underlying process. If applicant believes the claim is limited to a specific machine, please provide specific information on how the claim is so limited, including references to the specification in support of the limitation[s].

The underlying process does not require any pre-computer process activity. Means a. merely provides the data signal for use in the mathematical operation of means b. It does not measure physical objects or activities. The underlying process also does not require any post-computer process activity. Means c. merely conveys the direct result of means a. and b. Thus, as a computer-related invention, the claim must be limited to a practical application.

Means b. recites means for processing. Means b. corresponds to the calculation of codewords from a series of equations. Thus, means b. recites a mathematical operation. As noted above, means a. and c. do not impose

March 28,1996
Claim Analysis - Page 1

independent limitations on the claim beyond those required by the mathematical operation of means b. Therefore, the claimed invention merely converts one set of numbers into another set of numbers. Also, the preamble language is a statement of intended use that does not limit the claim to the practical application of monitoring and controlling an automated manufacturing plant. Claim 2 is rejected as a non-statutory machine claim under 35 U.S.C. § 101. Also, the Freeman-Walter-Abele test has been relied upon in analyzing the claimed invention. Under the test, the claimed invention is rejected as a non-statutory process because it is a process directed solely to solving a mathematical algorithm.

The following amendments to claim 2 would render claim 2 a statutory machine claim

- a limitation to one of the practical applications disclosed in the specification (e.g., monitoring and controlling an automated manufacturing plant or encryption of data signals to protect and secure contents);
- a limitation to a pre-computer process activity; or
- a limitation to a post-computer process activity.

CLAIM 3:

Claim 3 is a machine claim. It recites three claim limitations in means plus function language:

- a. Means a. recites means for generating. The specification discloses use of general purpose computer system with various memory sections. It does not disclose specific hardware, specific software, or a combination thereof for this function;
- b. Means b. recites means for compression. The specification discloses specific software in a preferred embodiment. It also discloses use of a general purpose computer system with encoders and decoders, and the creation of alternate computer programs based on the disclosed high-level written descriptions and disclosed flow charts; and
- c. Means c. recites means for encryption. The specification discloses specific software in a preferred embodiment. It also discloses use of a general purpose computer system with an ASIC in another embodiment, and the creation of alternate computer programs based on the disclosed high-level written descriptions and disclosed flow charts.

Reviewed as a whole, and given its broadest reasonable interpretation, the claim is not limited to a specific machine. Thus, the claim is presumed to encompass any and every machine embodiment of the underlying process. Accordingly, the claim has been analyzed on the basis of the underlying process. If applicant believes the claim is limited to a specific machine, please provide specific information on how the claim is so limited, including references to the specification in support of the limitation[s].

The underlying process requires pre-computer process activity. Means a. transforms the outputs of the plant's sensors into an electrical signal for use in the computer system. The electrical signal is an intangible representation of the plant's outputs. Claim 3 is a statutory product claim.

CLAIM 4:

Claim 4 is a machine claim. It recites three claim limitations in means plus function language:

- a. Means a. recites means for compression. The specification discloses specific software in a preferred embodiment. It also discloses use of a general purpose computer system with encoders and decoders, and the creation of alternate computer programs based on the disclosed high-level written descriptions and disclosed flow charts;
- b. Means b. recites means for encryption. The specification discloses specific software in a preferred embodiment. It also discloses use of a general purpose computer system with an ASIC in another embodiment, and the creation of alternate computer programs based on the disclosed high-level written descriptions and disclosed flow charts; and
- c. Means c. recites means for controlling. The specification discloses use of a general purpose computer system. It does not disclose specific hardware, specific software, or a combination thereof for this function.

Reviewed as a whole, and given its broadest reasonable interpretation, the claim is not limited to a specific machine. Thus, the claim is presumed to encompass any and every machine embodiment of the underlying process. Accordingly, the claim has been analyzed on the basis of the underlying process. If applicant believes the claim is limited to a specific machine, please provide specific information on how the claim is so limited, including references to the specification in support of the limitation[s].

March 28, 1996
Claim Analysis - Page 2

The underlying process requires post-computer process activity. Means c. controls the outputs of the automated manufacturing plant on the basis of the information contained in the decrypted and decompressed data signal. Claim 4 is a statutory product claim.

CLAIM 5:

Claim 5 is a machine claim. It recites two claim limitations with one claim limitation in means plus function language:

- a. Means a. recites means for compression. The specification discloses specific software in a preferred embodiment. It also discloses use of a general purpose computer system with encoders and decoders, and the creation of alternate computer programs based on the disclosed high-level written descriptions and disclosed flow charts;
- b. Element b. recites an application specific integrated circuit with its various hardware components for encryption.

Reviewed as a whole, and given its broadest reasonable interpretation, the claim is limited to a specific machine. Claim 5 is a statutory machine claim.

CLAIM 6:

Claim 6 is a process claim. It is directed to the same process as the underlying process analyzed in the machine claim of claim 1. Thus, claim 6 is a statutory process claim for the reasons stated above for claim 1.

CLAIM 7:

Claim 7 is a process claim. It is directed to the same process as the underlying process analyzed in the machine claim of claim 2. Thus, claim 7 is rejected as a non-statutory process claim under 35 U.S.C. § 101 for the reasons stated above for claim 2. Also, the Freeman-Walter-Abele test has been relied upon in analyzing the claimed invention. Under the test, the claimed invention is rejected as a non-statutory process claim because it is a process directed solely to solving a mathematical algorithm.

The following amendments to claim 7 would render claim 7 a statutory process claim:

- a limitation to one of the practical applications disclosed in the specification (e.g., monitoring and controlling an automated manufacturing plant or encryption of data signals to protect and secure contents);
- a limitation to a pre-computer process activity; or
- a limitation to a post-computer process activity.

CLAIM 8:

Claim 8 is a process claim. It is directed to the same process as the underlying process analyzed in the machine claim of claim 3. Thus, claim 8 is a statutory process claim for the reasons stated above for claim 3.

CLAIM 9:

Claim 9 is a process claim. It is directed to the same process as the underlying process analyzed in the machine claim of claim 4. Thus, claim 9 is a statutory process claim for the reasons stated above for claim 4.

CLAIM 10:

Claim 10 is unclear as to whether it claims a machine, an article of manufacture, or an arrangement of data. In particular, it is unclear whether: (1) the preamble defines an arrangement of data, a machine, or an article of manufacture, (2) the body of the claim defines an arrangement of data, a machine, or an article of manufacture, and (3) how the phrase "data portion" in the body of the claim relates to the preamble. The claim is rejected under 35 U.S.C. § 112, ¶2 for failure to distinctly point out and claim the invention.

Claim 10 is also rejected under 35 U.S.C. § 101. As either a machine, an article of manufacture, or an arrangement of data, the claimed invention recites non-functional descriptive material, e.g., mere data. For example, embodied on the "first data portion" of the "computer system apparatus" is the plant's operating parameters. Non-functional descriptive material does not impart functionality to either the data as claimed or the computer system. The allowance of such a claim would exalt form over substance.

March 28,1996
Claim Analysis - Page 3

Claim 10 is further rejected under 35 U.S.C. § 103 as obvious. The embodiment of mere data on a "computer system apparatus" would have been obvious to a person of ordinary skill in the art at the time of invention.

CLAIM 11:

Claim 11 is unclear as to whether it claims a computer program *per se* or a computer program embodied on a computer-readable medium. In particular, the preamble phrase "computer program" defines a set of instructions for execution on a computer, *i.e.*, a computer program *per se*. The body of the claim, however, recites means plus function language which defines at least a set of instructions embodied on a computer-readable medium to perform the recited functions. The claim is rejected under 35 U.S.C. § 112, ¶2 for failure to distinctly point out and claim the invention.

Claim 11 is also rejected under 35 U.S.C. § 101. It is reasonable to presume that applicant seeks to claim a computer program *per se*. A computer program *per se* cannot define any structural and functional interrelationships that permit the computer program's functionality to be realized.

The following amendment to claim 11 would render claim 11 a statutory article of manufacture claim:

- embodying the computer program on a computer-readable medium.

Claim 11 could also be amended to recite a statutory process.

CLAIM 12:

Claim 12 is an article of manufacture claim. It recites a computer program with two claim limitations:

- a. Element a. recites a specific source code segment for compression; and
- b. Element b. recites a specific source code segment for encryption.

Reviewed as a whole, and given its broadest reasonable interpretation, the claim is limited to a specific article of manufacture. Also, the computer program is embodied on a computer-readable medium. Thus, claim 12 is a statutory article of manufacture claim.

CLAIM 13:

Claim 13 is an article of manufacture claim. It recites a computer program with two claim limitations:

- a. Element a. recites a specific source code segment for compression; and
- b. Element b. recites a specific source code segment for encryption.

Reviewed as a whole, and given its broadest reasonable interpretation, the claim is limited to a specific article of manufacture. Also, the computer program is embodied on a computer-readable medium--the carrier wave. Thus, claim 13 is a statutory article of manufacture claim.

March 28,1996
Claim Analysis - Page 4